AEROJET

Integrated Advanced Microwave Sounding Unit-A (AMSU-A)

Engineering Test Report
Radiated Emissions and
SARR, SARP, DCS Receivers, Link Frequencies
EMI Sensitive Band Test Results
AMSU-A1, S/N 108

Contract No. NAS 5-32314 CDRL 207

Submitted to:

National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt, Maryland 20771

Submitted by:

Aerojet 1100 West Hollyvale Street Azusa, California 91702

Aerojet

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1. INTRODUCTION

1.1 General

This document contains the procedures and test results of the radiated emissions tests performed on the AMSU-A1 instrument, part number 1331720-2, serial number 108. The test was performed as described in paragraph 3.4.6 of AE-26151/5E Test Procedure, Electromagnetic Interference (EMI)/Electromagnetic Radiation (EMR) and Electromagnetic Compatibility (EMC) for Advanced Microwave Sounding Unit-A (AMSU-A), dated 11 February 1999.

1.2 Purpose

The purpose of this report is to describe the tests performed and to present the backup data collected to verify that the AMSU-A1 instrument meets the specified requirements. The tests performed encompass the discrete frequencies of the DCS, SARR, and SARP sensitive bands described in paragraph 3.6.1.4.1 of the Interface Specification, IS-3267415. In addition, the METOP requirements for the Advanced Microwave Sounding Unit-A1, Instrument Interface Control Document, MO-IC-MMT-A1-0001, paragraph 4.3.1.3.3, were incorporated. The requirement consisted of the radiated emissions per test method RE02, 14 kHz to 18 GHz, and the discrete frequencies of Table 4.3.1.3-2 in the ICD. This requirement is presented in Figure 1 of this document.

1.3 Scope

This document describes the test performed by Aerojet, and it is presented in the following manner:

Section 1	Contains general introductory material and a summary of the test results.
Section 2	Contains a detailed description of the test plan, test procedure, and test results.
Section 3	Contains supplementary test information, pertinent test data, and the list of test equipment used.

1.4 Summary of Test Results

The AMSU-A1 instrument, serial number 108, meets the radiated emissions requirements of the Interface Specification, IS-327415, and the Interface Control Document, MO-IC-MMT-A1-0001, paragraph 4.3.1.3, without exception.

2. TEST PROGRAM

2.1 Test Article

The AMSU-A system passively monitors radiation from the earth's surface and atmosphere in the microwave portion of the spectrum. The instruments incorporate fifteen total-power super heterodyne type radiometers. The system is composed of two independent instruments. The module designated as AMSU-A2 contains the two lowest-frequency channels, i.e., Channel 1 has the 28.8 GHz frequency and Channel 2 has the 31.4 GHz frequency. The module designated as AMSU-A1 contains the thirteen remaining channels with frequencies from 50.8 GHz to 89 GHz.

Periodic on-board calibration is accomplished by using an in-flight blackbody calibration and cold space as energy reference sources. During each scan, the shrouded reflector observes 30 earth scene cells with one sample period each and two calibration target cells with two sample periods each. Complete end-to-end in-flight calibration from the antenna to the AMSU-A instrument output is provided for each channel. This will yield the maximum in-flight calibration accuracy that gives the radiometric data the required sensitivity and precision.

At each frequency, the half power antenna beamwidth is a constant 3.33°. Thirty contiguous scene resolution cells spaced 3.33° along the scan line are sampled in a stepped-scan fashion every eight seconds. The scan covers 50° on each side of the satellite path.

2.2 Test Starting and Completion Dates

The AMSU-A1 instrument, serial number 108, was tested between October 25 and 29, 1999.

2.3 Instrumentation

All instrumentation were suitable for the purpose intended. Each instrument used was within its certification period. Instrumentation accuracy was verified by calibration in accordance with MIL-STD-45662 as implemented and controlled by Aerojet standard operating procedures. The attached Test Data Sheet 2, in Section 3, contains the list of the equipment with pertinent traceability information.

2.4 Test Frequencies

The test frequencies were selected from paragraph 3.6.1.4.1 of the interface specification, IS-3267415, and are listed in Tables I and II. The RE02 METOP requirements are presented in Figure 1 and the table within the figure.

Table I SARR, SARP, DCS Receiver Channel Guard Limits

Frequency (MHz)	Radiation Limit	E-Field Limit *	Notes
	(dBm)	(dB μV/m)	
118.00 - 120.00	-100	18.9	121.5 MHz
120.00 - 121.450	-125	-6	121.5 MHz
121.450 - 121.485	-145	-26	121.5 MHz
121.485 - 121.515	-150	-31	121.5 MHz
121.515 - 121.550	-145	-26	121.5 MHz
121.550 - 123.000	-125	-5.9	121.5 MHz
123.00 0 - 125.000	-100	19.2	121.5 MHz
236.000 - 240.000	-100	24.9	243.0 MHz
240.000 - 242.925	-125	0	243.0 MHz
242.925 - 242.975	-145	-20	243.0 MHz
242.975 - 243.025	-150	-25	243.0 MHz
243.025 - 243.075	-145	-20	243.0 MHz
243.075 - 246.000	-125	0.1	243.0 MHz
246.000 - 250.000	-100	25.3	243.0 MHz
385.100 - 401.100	-100	29.4	406.05 MHz
401.100 - 405.900	-125	4.5	406.05 MHz
405.900 - 406.000	-145	-15.5	406.05 MHz
406.000 - 406.100	-150	-20.5	406.05 MHz
406.100 - 406.200	-145	-15.5	406.05 MHz
406.200 - 411.000	-125	4.6	406.05 MHz
411.000 - 425.000	-100	29.9	406.05 MHz
396.000 - 401.500	-125	4.4	401.65 MHz
401.500 - 401.600	-145	-15.6	401.65 MHz
401.600 - 401.700	-150	-20.6	401.65 MHz
401.700 - 401.800	-145	-15.6	401.65 MHz
401.800 - 406.000	-125	4.5	401.65 MHz

^{*} E-field limits have been calculated by METOP and are for reference only. The following formula has been applied for translating Power levels to Field strength levels.

$$E[dB\mu V/m] = P[dBm] - Gr[dBi] + 20 \log(f[Hz]) - 42.7$$

where P is the received power, Gr is the gain of the receiving antenna and f is the frequency. Note that Gr has arbitrarily been set to 0 dB (isotropic) in calculating the above levels. E-field limits would have to be adjusted to reflect actual antenna characteristics.

Table II METSAT Special Frequencies

Frequency	Receiver/Ampl Sensitivity
59.458 MHz ±0.5 kHz	-60 dBm
60.10 MHz ±0.5 kHz	-60 dBm
141.360 MHz ±0.5 kHz	-60 dBm
142.9 MHz ±0.5 kHz	-60 dBm
282.733 MHz ±0.5 kHz	-60 dBm
285.813 MHz ±0.5 kHz	-60 dBm
371.921 MHz ±0.5 kHz	-60 dBm
375.972 MHz ±0.5 kHz	-60 dBm
624.925 MHz ±0.5 kHz	-60 dBm
631.730 MHz ±0.5 kHz	-60 dBm
743.841 MHz ±0.5 kHz	-60 dBm
751.944 MHz ±0.5 kHz	-60 dBm
121.5 MHz ±15 kHz *	-150 dBm
	(Bandwidth 100 Hz)
243 MHz ±25 kHz *	-150 dBm
	(Bandwidth 100 Hz)
401.650 MHz ±50 kHz *	-150 dBm
	(Bandwidth 100 Hz)
406.05 MHz ±50 kHz *	-150 dBm
	(Bandwidth 100 Hz)
2010-2040 MHz	-120 dBm

^{*} METOP replaces these frequencies with the frequencies in Table I.

2.5 Operational Mode

The AMSU-A1 instrument was tested in the IN-ORBIT (full scan) mode of operation. In this mode, the antenna is rotating continuously and all the circuits are working. The maximum electric field radiated emissions are produced in this mode of operation.

2.6 Test Location

This test was conducted in the shielded enclosure located in Building 183 of the Aerojet test facility.

2.7 Test Procedure

This test procedure insures that the AMSU-A1 instrument can demonstrate compliance in meeting the radiated emissions limits presented in Figure 1, and Tables I and II. The test procedure that was followed during conduction of the test conforms with the Process Specification, Test Procedure, Electromagnetic Interference (EMI)/Electromagnetic Radiation (EMR) and Electromagnetic Compatibility (EMC) for Advanced Microwave Sounding Unit-A (AMSU-A), document number AE-26151/5E paragraph 3.4.6.

The steps that were followed during the conduct of the test are the following:

- Step 1. Connect the antenna to the proper receiver/amplifier port. Verify that the AMSU-A is operating in the IN ORBIT mode.
- Step 2. Allow the EMC test equipment to warm up for a minimum of 10 minutes.
- Step 3. Program the spectrum analyzer system (HP 8566B) to automatically scan and plot all narrowband data from 14 kHz to 1 GHz, switching the appropriate antenna/amplifier throughout the frequency range.
- Step 4. All data shall be below the limits shown in Figure 8 (AE-26151/5E). If any emissions are observed to exceed the limit line, command the computer to print the measured levels.
- Step 5. If any narrowband signals exceed the limits, perform an ambient test and determine the source of the emanations. Reduce or eliminate the source, if external to the AMSU-A instrument, and repeat the test.
- Step 6. Set up horn antenna (RGA-180) one meter from the point of maximum radiation.
- Step 7. Self-calibrate the signal analyzer.
- Step 8. Sweep throughout the frequency range of 1 to 18 GHz, in a minimum of two ranges, recording the observed narrowband emission levels.
- Step 9. All data shall be below the limits shown on Figure 8 (AE-26151/5E); if not, perform step 5.
- Step 10. Affix all plots, photos, calculations, and related information to TDS 2.
- Step 11. After disconnecting the horn antenna, set the signal analyzer to one of the four frequencies listed in 3.4.6 (AE-26151/5E) with the appropriate frequency span.
- Step 12. Activate the series preamplifier (HP 71210 of the spectrum analyzer (HP 71200)) and reduce the test equipment bandwidth to 10 kHz or less.
- Step 13. Program the signal analyzer for noise averaging to a minimum of eight times. Verify that the sensitivity noise level is below the required level.
- Step 14. Connect the antenna to the signal analyzer amplifier input.
- Step 15. The measurement should be within the ambient level, and no narrowband frequencies should be detected at the specified frequency above the sensitivity level specified in 3.4.6 (AE-26151/5E). Plot the screen presentation.
- Step 16. Repeat steps 11 through 15 while performing a measurement on the remaining frequencies.
- Step 17. Record the information regarding the test on TDS 2 and attach all plots, photos, calculations, and other related information.
- Step 18. Repeat steps 11 through 15 while performing measurements on the frequencies depicted on Table III (AE-26151/5E).
- Step 19. Repeat step 17.
- NOTE: Reference to "frequencies listed in 3.4.6 (AE-26151/5E)" means Table II of this document. Reference to "Figure 8 (AE-26151/5E)" is the same as Figure 1 of this document. Reference to "Table III" is the same as Table I of this document.

2.8 Test Results

No radiated emissions were recorded above the specified sensitivity levels. The emissions detected were ambient emissions produced by the Halon System. Some emissions were introduced into the shielded enclosure via the interconnect cables. In this case, the cables were moved to an area of minimum emissions, i.e., until the detected emissions were below the specified level.

The recorded data is presented in this order:

Plots 1 through 14	Cover the frequency range from 118.00 MHz to 125.00 MHz. The odd numbered plots represent the antenna in the horizontal position. The even numbered plots represent the antenna in the vertical position. The emission that approximated the limit was a signal at 121.504 MHz, 0.45 dBm below limit with the antenna in the vertical position. See plot 8.
Plots 15 through 21	Cover the frequency range from 236.00 MHz to 250 MHz. The test was conducted with a circularly polarized antenna, for this and all subsequent measurements above 200 MHz. The emission that approximated the limit, in this frequency range, was a signal at 243.014 MHz, 0.23 dB below the limit. See plot 18.
Plots 22 through 28	Cover the frequency range from 385.10 MHz to 425.00 MHz. The emission that neared the limit was detected at 405.931 MHz, 0.53 dB below the limit. See plot 24.
Plots 29 through 33	Cover the frequency range from 396.00 MHz to 406.00 MHz. The detected emission that approximated the limit was a signal at 401.649 MHz, 2.98 dB below the limit. See plot 31.
Plots 34 and 35	Represent the telemetry frequency of 2.010 to 2.040 GHz. All detected emissions in this frequency are a minimum of 0.59 dB below the limit. This test was performed in the horizontal and vertical polarization of the double-ridged guide antenna. See plot 34.
Plots 36 through 51	Contain the twelve special frequencies from 59.458 MHz to 751.944 MHz listed in Table II. The frequencies between 59.458 to 142.9 MHz were tested with the antenna in two polarities. All recorded emissions were detected 33 dB below the limit.
Plots 52 through 57	These plots present the test method RE02, electric field emissions, throughout the frequency range of 14 kHz to 18 GHz. The frequency ranges of 30 MHz to 200 MHz and 1 to 18 GHz were performed with the antenna in two polarities. The emission that nears the specification, i.e., 2 dB below the limit was detected at 29 MHz. See plot 52.
Plots 58 through 68	Cover the METOP special frequencies listed in Figure 1. The frequency range between 400 and 500 MHz was measured with a circularly polarized antenna. The levels were 13 dB below the limit. The other five frequencies between 1217 and 5852 MHz were tested with the double-ridged guide antenna in two polarities. The

level is 1.4 dB below the limit. See plot 66.

recorded emission that approximates the limit was recorded at 5.255 GHz where the

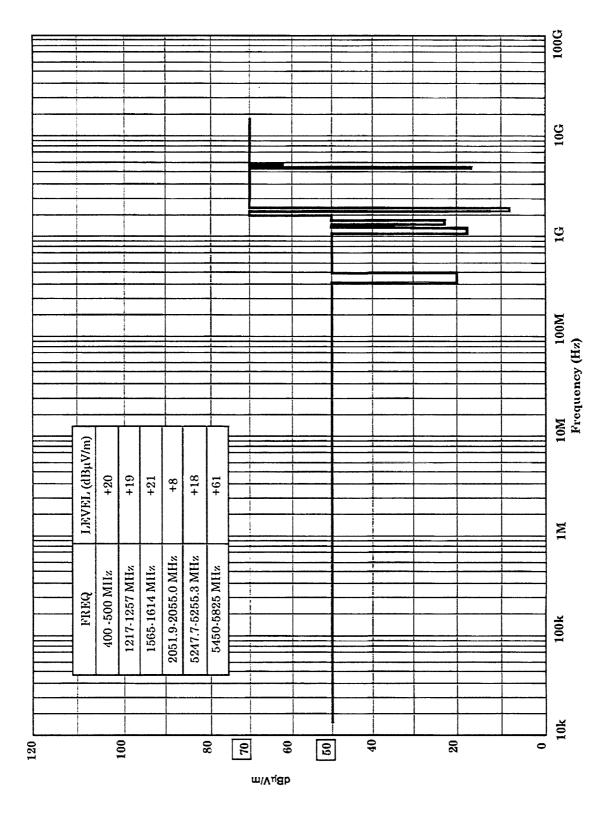


Figure 1 Radiated Narrowband Limits for Electric Field Emissions METOP Only

3. SUPPLEMENTARY INFORMATION

3.1. Supplementary Information

This section contains the Test Data Sheet, Plots, and the equipment.

TEST DATA SHEET 2 (Sheet 1 of 3) 3.4.6: RE02 Test

Test Setup Verified: Kan Vau (5)

	Sig.	ature			
4.6.3.1 Step 1: Test Equipmen	t Log				
: Item	Manufacturer	Model/ Part No.	Aerojet Inventory No.	Calibration Date	Calibration Due Date
Spectrum Analyzer	HP	700044	55441	10-19-99	5-19-80
Plotter	HP	74704	57760	CHR	ENR
Spectrum Analyzer	HP	85668	54861	4-5-99	11-5-99
Plotler	HP	74754	47417	CNR	CNR
Active Rod Antenna	EMCO	3301 B	55635	1-7-99	1-7-00
Biconical Intenna	EMCO	93110	C200204	2-24-99	2-24-00
Biconical Intenna	E MCO	3110	55361	11-6-98	11-6-99
Double Ridged. Guide Intenna	Electro Metrics	RG180	1508357	16-21-18	11-8-99
Log Spiral Antenna	Electro Metrics	LCA 25	1508358	2-25-99	2-25-00
Computer	49	9836	46 134- 15	CNR	CUR
Plotter	HP	14754	47417	CNR	CHE
Amplifier	HP	8447F Opt 464	C200230	9-15-99	1-15-0
Amplifier, Microwave	HP	84498	C200203	8-9-99	8-9-00

TEST DATA SHEET 2 (Sheet 2 of 3) 3.4.6: RE02 Test (Cont)

Test Setup Verified: _ Signature

Step	Antenna/Frequency	Band	Required	Emissions w	ithin limits?	Comments/ Observations
				Yes	No	PLOTS #
4	All except Horn 14 kHz to 1 GHz	Narrow	See Figure 6	~		52 \$53
-6	All except Hom -14 ki iz to 1 GHz	Broad	See Figure 7			
12	Hom, RGA-180 1 to 2 GHz	Narrow Mu	See Figure 6	~		54 \$ 55
15	Biconical, EMCO 3104 121.5 MHz with Ampl	Narrow	No narrow- band freq. > -150 dBm	V		7 #8
16	Log Conical, EMCO 3101 243 MHz, 401.65 MHz, & 406.05 MHz with Ampl	Narrow	No narrow- band freq. > -150 dBm	v ;		18,25, \$31
19	Horn, RGA-180 2010 to 2040 MHz with Ampl	Narrow	No narrow- band freq. > -120 dBm	V	•	34 ¢35
21	Biconical/Log Conical 59.458 to 751.944 MHz	Narrow	No narrow- band freq. > -60 dBm	r		36 Through 51
21,1	400 to 500 MHz في ا	Narrow	-107.1dBm	1		58
21	10 Z to 18 GHz M	Narrow	Figure 3	V		56\$57
24/	1217 to 1227 MHz/20/2	7 Narrow	-111.8 dBm	V		59 \$60
21	1565 to 1614 MHz	Narrow	-111.2 dBm	1.		61 \$ 62
21	2051.9 to 2055 MHz	Narrow	-126.7 dBm	V		13\$14
21	5254.7 to 5255.3 MHz	Narrow	-122.8 dBm	V		65 \$ 61
21	5450 to 5825 MHz	Narrow	-80.7 dBm	V		67\$68

NOTE: Attach all backup data generated during the test (photos, printouts, plots, test logs, additional comment or observations, etc.) to this data sheet.

TEST DATA SHEET 2 (Sheet 3 of 3) 3.4.6: RE02 Test (Cont)

4.6.3 tep	.2: Emission MeasuremenAntenna*/FrequencyRange (MHz)	ts Band	Radiation Limit (dBm)	Emissions w	rithin limits?	Comments/ Observations
	range (wii 12)		(GB)	Yes	No	Plots
22	118.000 - 120.000	Narrow	-100 / Table IV	~		1#2
22	120.000 -121.450	Narrow	-125 / Table IV	/		3 \$ 4
22	121.450 - 121.485	Narrow	-145 / Table IV	V		5\$6
22	121.515 - 121.550	Narrow	-145 / Table IV	/		9\$10
22	121.550 - 123.000	Narrow	-125 / Table IV	V		11 \$ 12
22	123.000 - 125.000	Narrow	-100 / Table IV	V		13 \$ 14
23	236.000 - 240.000	Narrow	-100 / Table IV	V		15
23	240.000 - 242.925	Narrow	-125 / Table IV	~		14
23	242.925 - 242.975	Narrow	-145 / Table IV	v _	·	17
23	243.025 - 243.075	Narrow	-145 / Table IV	V	• .	19
23	243.075 - 246.000	Narrow	-125 / Table IV	~		20
23	246.000 - 250.000	Narrow	-100 / Table IV	~		2/
23	385.100 - 401.100	Narrow	-100 / Table IV			22
23	401.100 - 405.900	Narrow	-125 / Table IV	~		23
23	405.900 - 406.000	Narrow	-145 / Table IV	V		24
23	406.1 00 - 406.200	Narrow	-145 / Table IV	/		26
23	406.200 - 411.00	Narrow	-125 / Table IV	V		2 7
23	411.000 - 425.000	Narrow	-100 / Table IV	· V	-	28
23	396.000 - 401.500	Narrow	-125 / Table IV			29
23	401.500 - 401.600	Narrow	-145 / Table IV			30
23	401.700 - 401.800	Narrow	-145 / Table IV	V		32
23	401.800 - 406.000	Narrow	-125 / Table IV	V		33

Unit 4MSU-41 1331720-2 Engineer: 29 Cot 19

Serial No. 108

Quality Control: 100 Unit 29 Cot 99

Shop Order 778914 Oper 50-0-00 Customer Representative: 27/001/49

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	*AT 10	E	1.1				22	畫		START *RB 30

-145 alBm

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PLOT MHz	AEROJET ELECTRONIC SYSTEMS	ш				5 mm v 4 4 pm			The state of the s	MHZ
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93	51.	Z SAMPL	75	13/2	5. A. C.		-		毫	STOP 121.515 00 ST 100 0
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SARR & SARP FRQ 121.49	STE	1445U- A 1331720 54108	200	للار	B		A. Warrenstein		3	 12
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0CT 27, 1999 REOZ dat: Lbrizoalal MKR	10.		> Prince range and a					dend as the south	€	1
1 0C1 21, 1999 REOZ Bm dot: Kbrizontal MKR #1										H,
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11. 18 m)	Tributary agraphy agra	MHz	_				valence of the second of the s		н8
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7 : C	В 4В	-	33						3	6
1. -86	M 69 S S	KEF	F .	<u></u>					量—	RI
(A) 15:29:31 RL -80.00 dE	ATT 10.	MAR	121.493	-15		В	is passed to be a second control of the seco		李	START *RR 30
· · ·	*	<u> </u>	1		1	1		<u> </u>	8300	.

-156 d8m

m dot: Noviet Market # 1 FRQ 121.504 35 MHz	45 dBm	SAMPLE					manifesta de la company de la	1 1	uu inz .0 sec
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121.5	AFROJET FIFCTRONIC SYSTEMS	20-2	78914 50-0-00 26151	6. A. C	\	-	tophrodyna	2 7 6 7	BB CIC.IBI ANIS BI 100.0
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Perfect !	L T T						ANT WAY		nnz 30.0 Hz
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7 mgp	2	>	MHz				A PANENT		80 CBF.1
30.00	ATTEN Ø dB	. B	504 35 45 dBm	-			whitemaker		1 121 8.8 Hz
	*ATTE	MARKER	121. -150.	-	8		*	i d	* RR 36
	*ATTE	MAR M	121. -150		æ		dem why	i i	<u>ا</u>

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		MHz				事	515 00
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_	_	<u> </u>		MHz				-		.515
(4) 89:44:81 Bl -88 88 48"	0 dB	d8/D.		989			•			121.51 Ø Hz
09 - 80	TEN) . OO	MARKER	121.519 -148.62			-	3		START *RB 30.
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02 SARR & SARP DL MKR #1 FRQ 121.706 MHz	135,55	SAMPL				1			3. BBB	ST 4.350
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0CT 26, 1999 REOZ Ant: Horizontal MK	AEROJ					Little of the property of the state of the s		-	MHz	VB 1.00 kHz
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MHz			\							And the same of th		MHz
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Œ	VIC SY	450-41 31720-	20-05	20%	6)		Lm/4 lan					တ
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MK	ECTRON	728) & [Anna mana	
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dBm dnt: Horizontal	HEROJ					:		o a Probateuro	MHz
É	^ 1	-	2					Arthur de la constante de la c	000
a. 00	Ø dB dB/DIV	E	798 MHz 57 dBm					- malaupus Marro	IRT 123.
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Z X	CTRON	440	, 4					the same	
Lical	ET EU							- Contraction	M VH.
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ocr 26, 1999	REROJET						Addition of the			MHz VB 1.00 kHz
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	*ATTEN 10.00	MARKE	240.000	1 1 20	æ					START *RB 1.
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SARR & SARP PL FRQ 242.927 94 MHz	-1 YSTEMS	N	77 8914 50-0-00 26151 /5	3.4.6						STOP 242.975 00 ST 166.7
1	IC S	4MSU-A 1331720 54 108	27.00	· .				THE STATE OF THE S		STOP
<i>REO2</i> MKR #1	AEROJET ELECTRONIC SYSTEMS	138. 138.	507	In				MANAGER AND STANSON OF THE PROPERTY OF THE PRO		
	ET EL		·					A HAMME		MHz 30.0 Hz
ocr 26, 1999	AEROJ							STATE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COL		BB MHz VB 3B.
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(49) 0 RL -8	*ATTEN 1	MARKE	242.927 -151.33	-	8			The Parket		START 242. *RB 30.0 Hz
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MHz	dBm						*	MHz
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	ONIC S							\$101
0CT 26, 1999 2502 MKR #1	ECTR			•				2
6, 199	OJET E							MHz 30.0 Hz
			7				E	25 00 N
14:01 30 dBm	dB 3/DIU		31 MH dBm					62
(2) 09:44:01 3L -80.00 dBm	*ATTEN B 10.88 d	ARKER	243,067 -149,72					START 243. *RB 30.0 Hz
Ø.	*	Σ	ני י	-		145 18m	3	*

2007 200 MHz	dBm	LJ						MHz sec
12 SARR & SARP PL MKR #1 FRQ 245.196 MHz	-133.90 IC SYSTEMS	-41150-26 BAMPL 1331720-2 54 108	50 778914 00 30-0-00 4E 26/51/5E	lar s. 4.6		The fight of the purpose of the fight of the		STOP 246.000 ST 8.775
OCT 26, 1999 <i>eeoz</i> MKR	AEROJET ELECTRONIC SYSTEMS					Physical desiration of the standard of the sta		MHz VB 1.00 kHz
E	*ATTEN Ø dB 10.00 dB/DIV	MARKER	245,196 MHz -133,90 dBm	1	8	The Catholican of the Catholic		START 243.075 *RB 1.00 kHz
					-125	d.Bm		

*ATTEN Ø dB 10 00 dR/niu	dBm	•		W	IKR #1	MKR #1 FRQ 400.16 MHz	1.16 MHz
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-133.67 dBm	150-4/SAMPLE 7/720-2	778914 50-0-00 26/51/5E	24.6		Handard And Andrew		
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84101 & SARP PL FRQ 405.931 B MHz	1	45U-1 83178 5N 100	50 77	la'.					STOP 406.000 ST 333
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REOZ MKR #1					· .		Wheel for the first of the firs		
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(4) 18 RI -86	*ATTEN 10.00	MARKER	405,931 -145 53		7		3		START *RB 30
	<u> </u>		<u> </u>				195 18m		

MHz		25				A-TIA-Int.	Ø MHz
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406. -1	4MSU-33172	2007	lar s				STOP 406.100
MKR #1 FRQ 406.010 5 MHz	3						\$10
MKR						Walter Barre	
MKR			•			White the state of	HZ
							B MHz
dBm 3	>	MHz	-			-	. 888
*ATTEN Ø dB	R	5 dB				THE WAY THE	
RL -8 ATTEN	MARKER	406.010 -151,52		r.		THE CONTRACT	START

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PLOT 26										,
	MHz	dBm		t u	13		-			MHz sec
c/B/o	191 3	47.49	SHMPI	8914 -0-00 6151/5	4.6					200 0 333.3
C & 54	:1 FRQ 406.191 3 h	1	445U-4 331720 SN 106	50 77 50 50	Jac G					9 406,200 ST 333.
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T 27,										B MHz VB 30.0
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(%)	RL -B	*ATTEN Ø dB 10.00 dB/DI	MARKER		-	J		**************************************		*RB 30
	-	*			1			145 dBm	<u> </u>	.

PLOT 27									 pol	1
MHz	dBm	LJ LJ		W		毒素			,	MHz
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FRQ 41		18817 18817 5W 102	2000	100						3TOP 4
\$ #1 #1		•				THE STATE OF THE S				
OCT 27, 1999 REOZ MKF							_			The second of th
1999						Mhallady				MHz VB 1.00 kHz
r 27,						MYHMYK		And the state of t		MHz VB 1.
:07 dBm			MHz dBm			臺				406.200 kHz
11:05:07 -80.00 dB	N Ø dB	8	156 06			Any hoped paragraphy hoped by				1 98 ·
	*ATTEN 10.00	MARKER	408. -131	-	8	3				*RB 1.00 kHz
					125	18m				

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d8/0 R	5 MHz 64 dB						
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REROJET ELECTRONIC SYSTEMS #MSU-4/SAMPLE 5xx 108 5xx 108		
*HILEN W GB 10.00 dB/DIV AE MARKER 396.241 MHz -131,24 dBm	B	

-125 18m

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	RL -80.00 dBm	TIF	10.	000		101	-148,67	-	,	n				-			Ī						SIARI *RR 3B	<u> </u>
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FRQ 401.649 6 -152.98	SAMPI	914 300 51/5E	i li						.700 0 MHz L.000 ksec
5446 \$ 5466 FRQ 401,649	LMSU-2 33/726 52/108	00 778 20 50 46 26	Par 3.4						STOP 401.
								Transport	S10
RECOR MKR									
1999							=		Ø Hz
0CT 27,								-	0 MHz VB 10.0 Hz
E		MHz					The state of the s		600
(2) 13:09:55 3L -80.00 dBr 3TTEN 0 dB 10.00 dB/DIV	æ	6 dB							. 401 1.0 Hz
(4) 13:09:55 RL -80.00 dB *ATTEN 0 dB 10.00 dB/DIV	MARKER	401.649 -152.98		J					*RB 10.0 Hz
<u> </u>	1	1			1	Š	dBm dBm		-T

2 0CT 27, 1999 REOZ SAR 18m 1U 1Hz 1Hz 1Hz 1Hz 1Hz 1Hz 1Hz 1Hz	708 0 MHz	148.03 dBm	L/SAMPLE	6914 5-0-00 6151/8E	46			800 0 MHz
MKR #1 MKR #1	SARR & S. FRO 401.		1880-A 1881720 5N 10	50 77 00 50	Parc	1		STOP 401.800 ST 333
	<i>RE02</i> MKR #1							
	27, 1999							
11:59:12 -80.00 dB -80.00 dB -80.00 dB -708 0 MH	_			7			季	, ,
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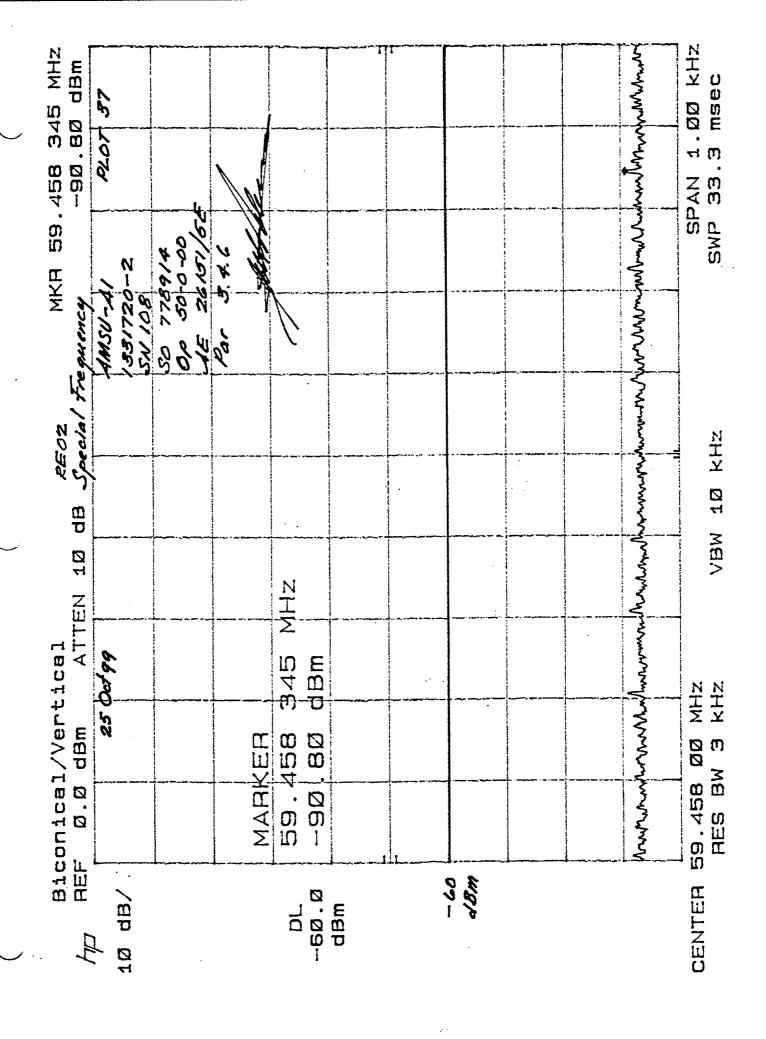
PLOT 33					ī]
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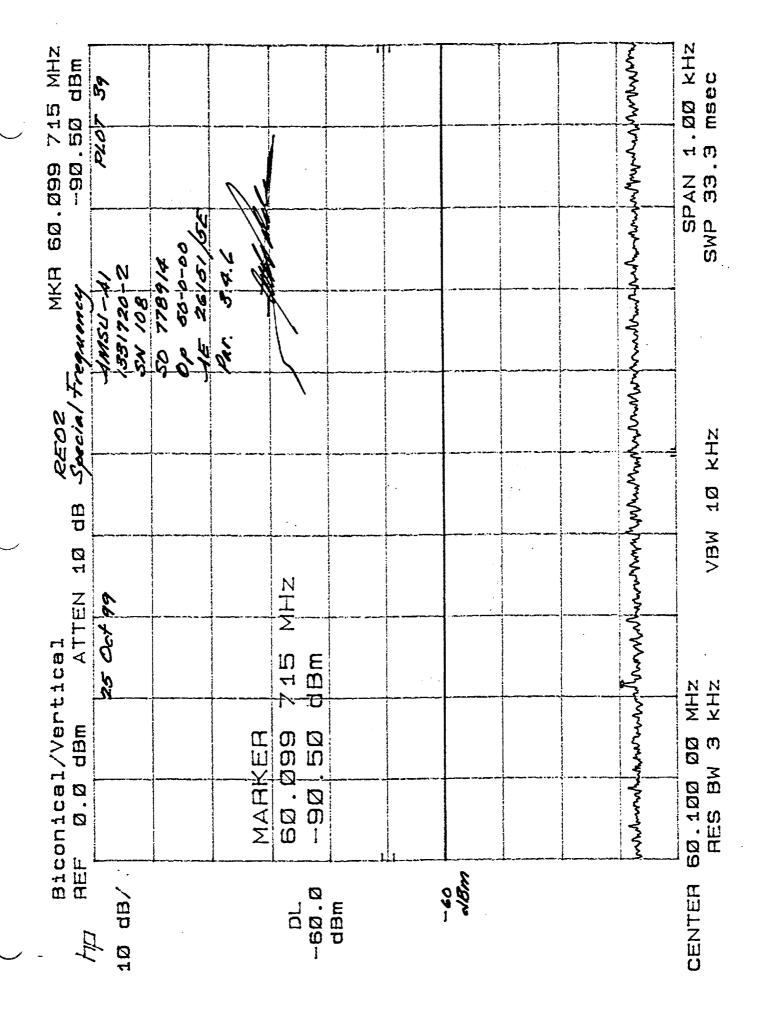
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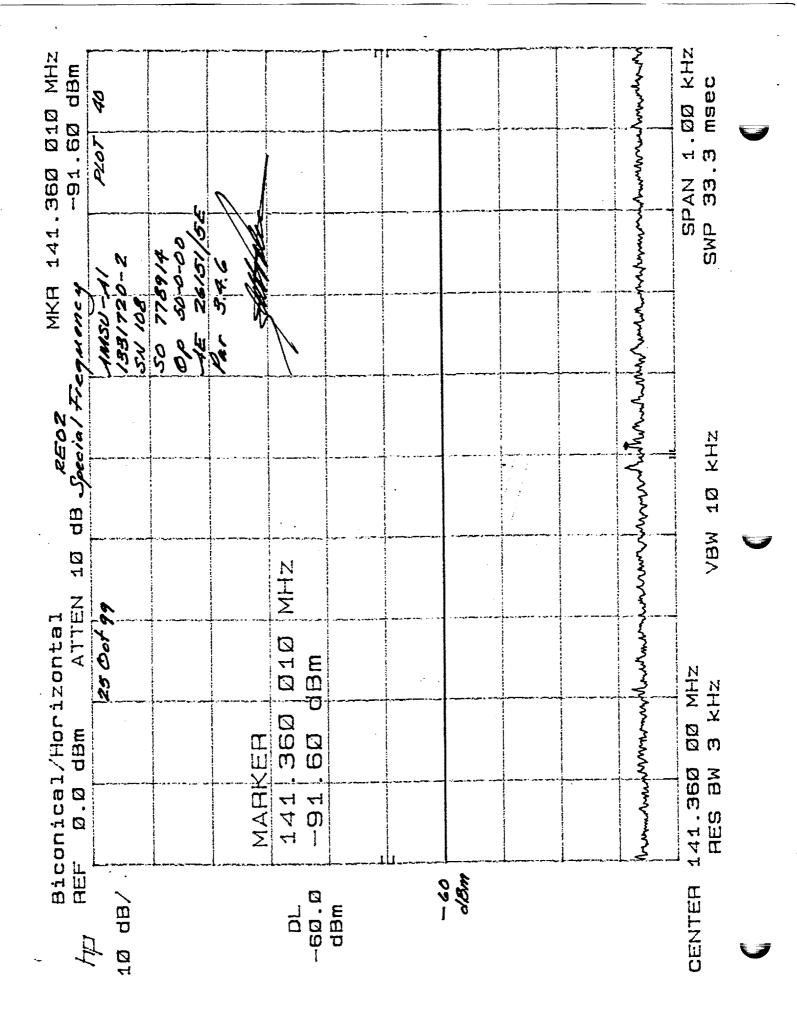
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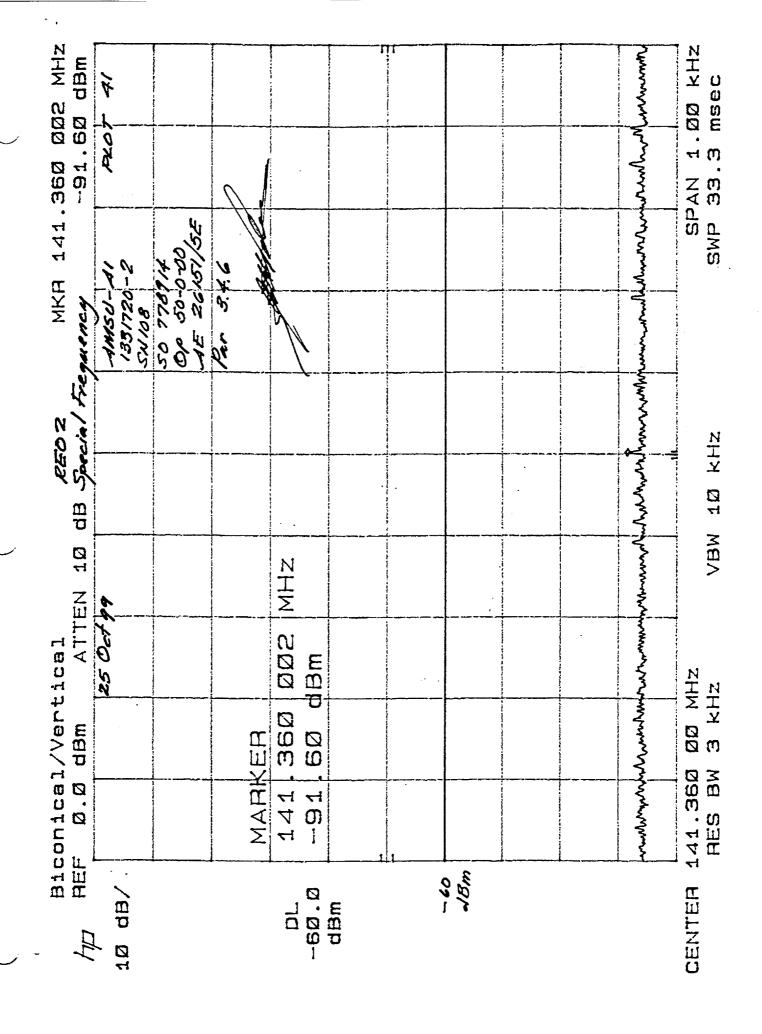
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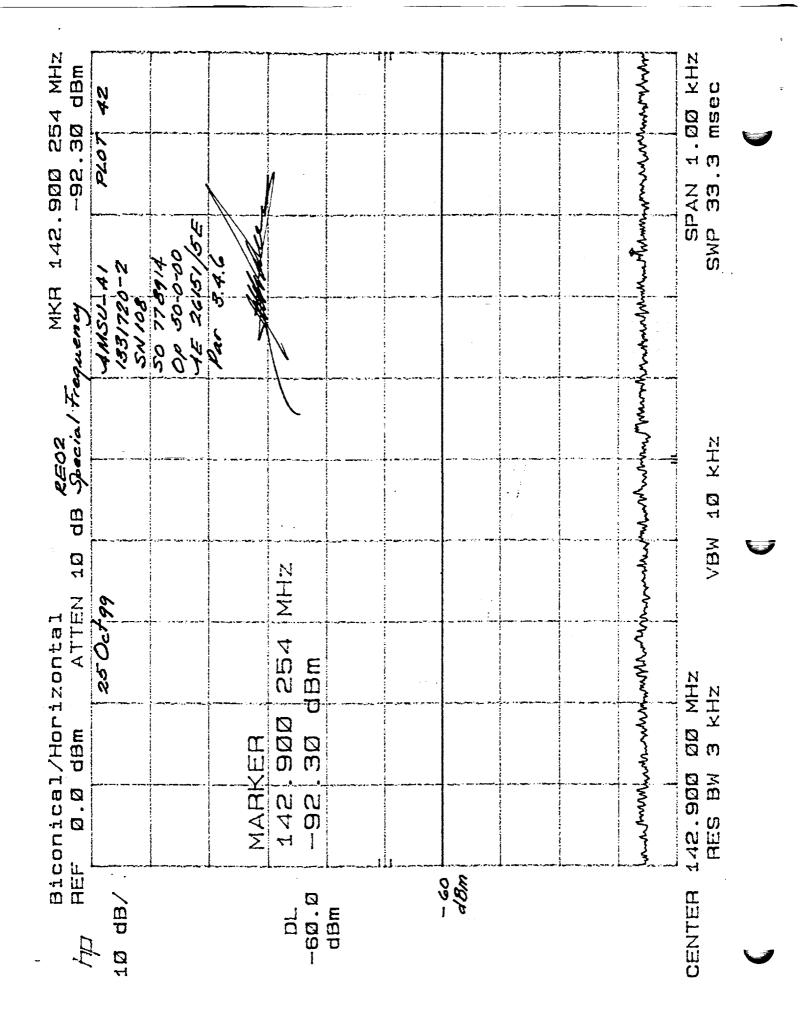


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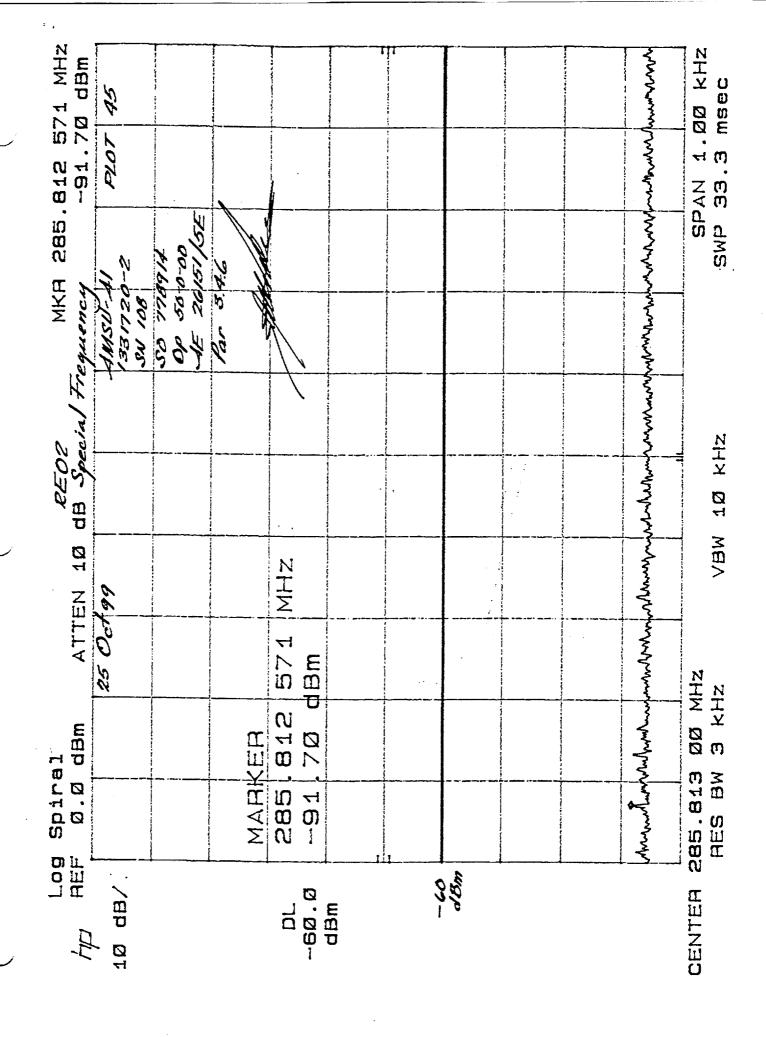


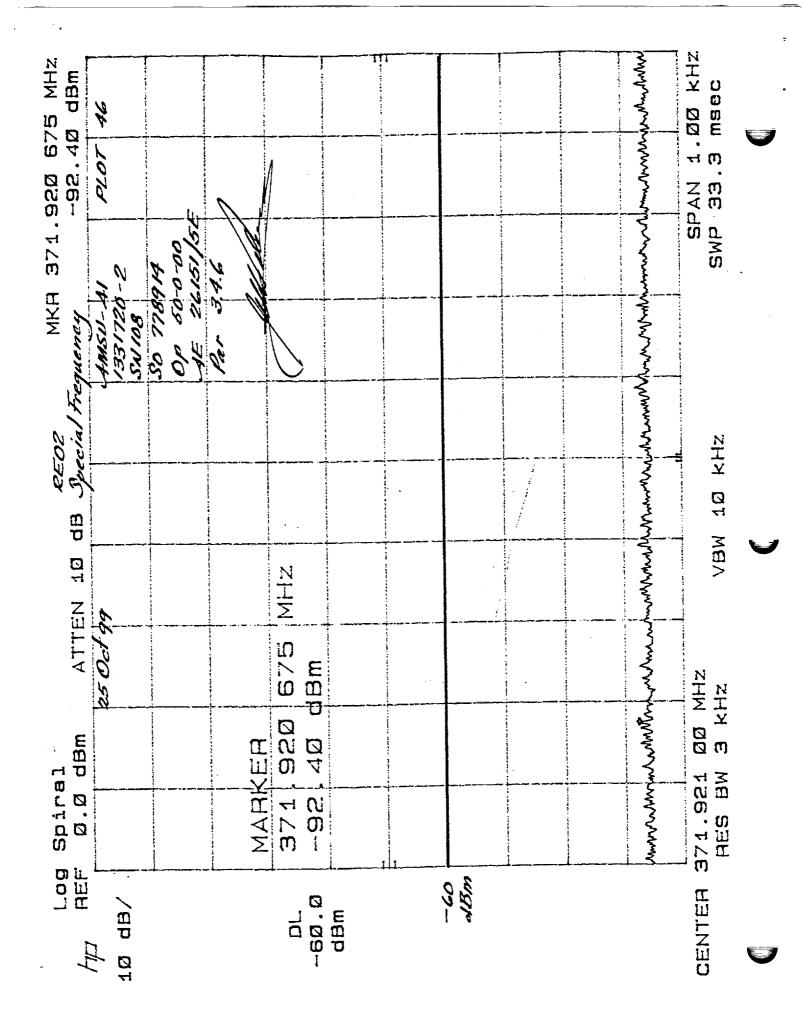


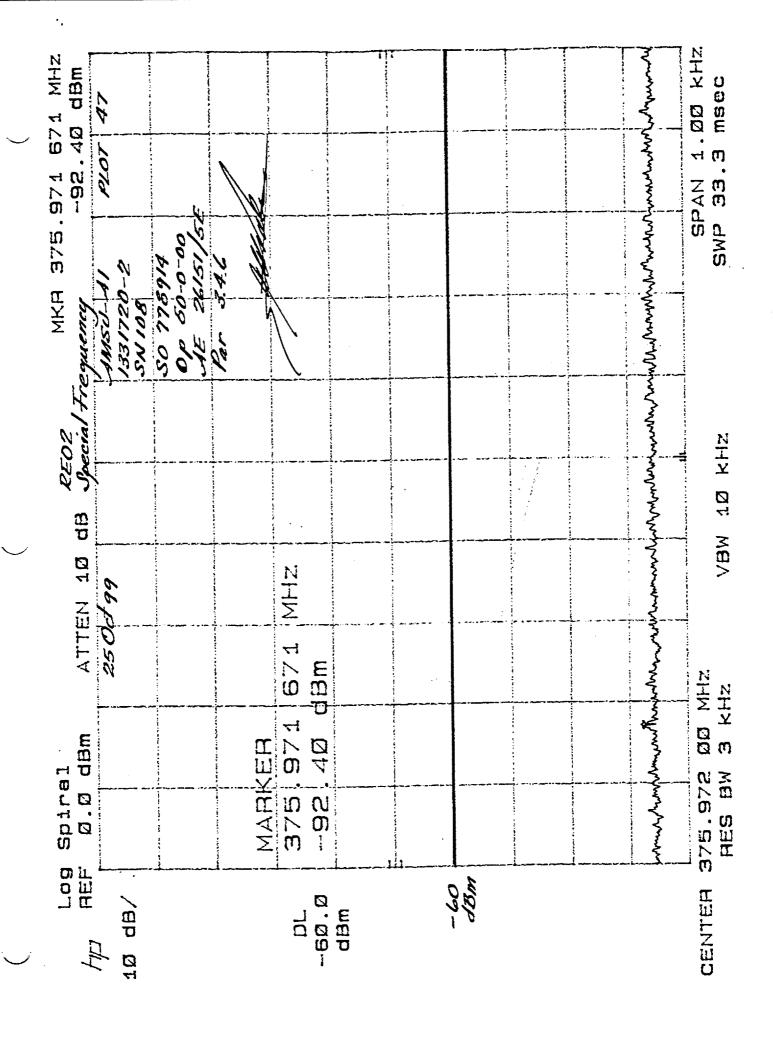


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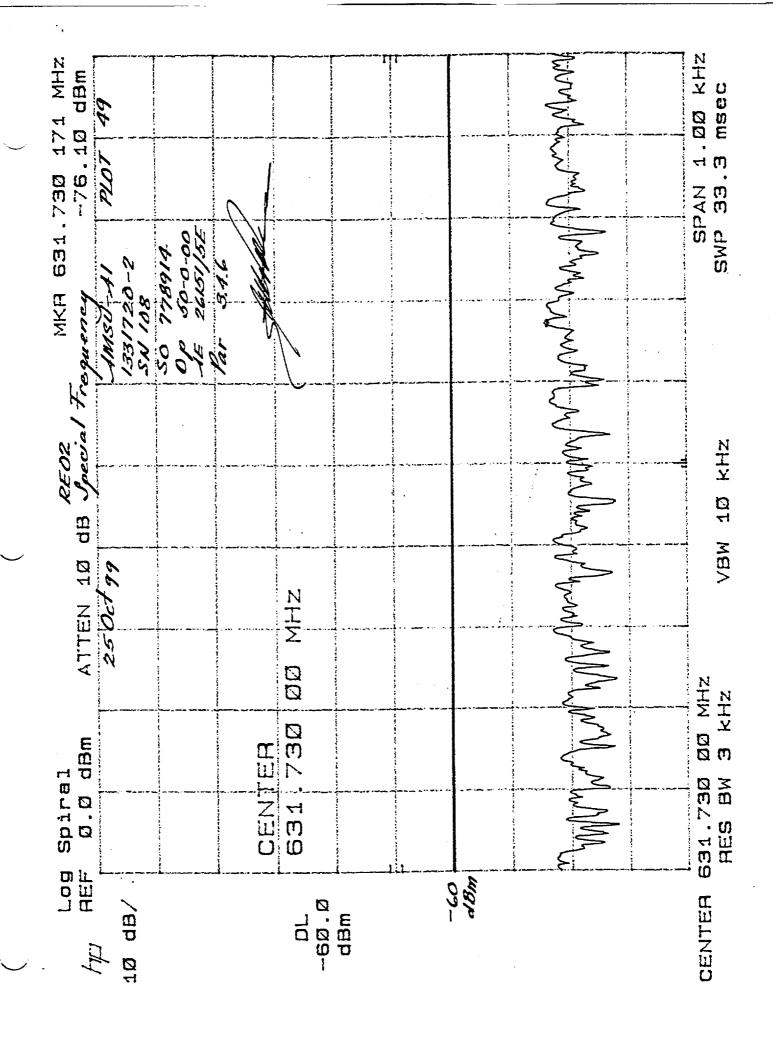


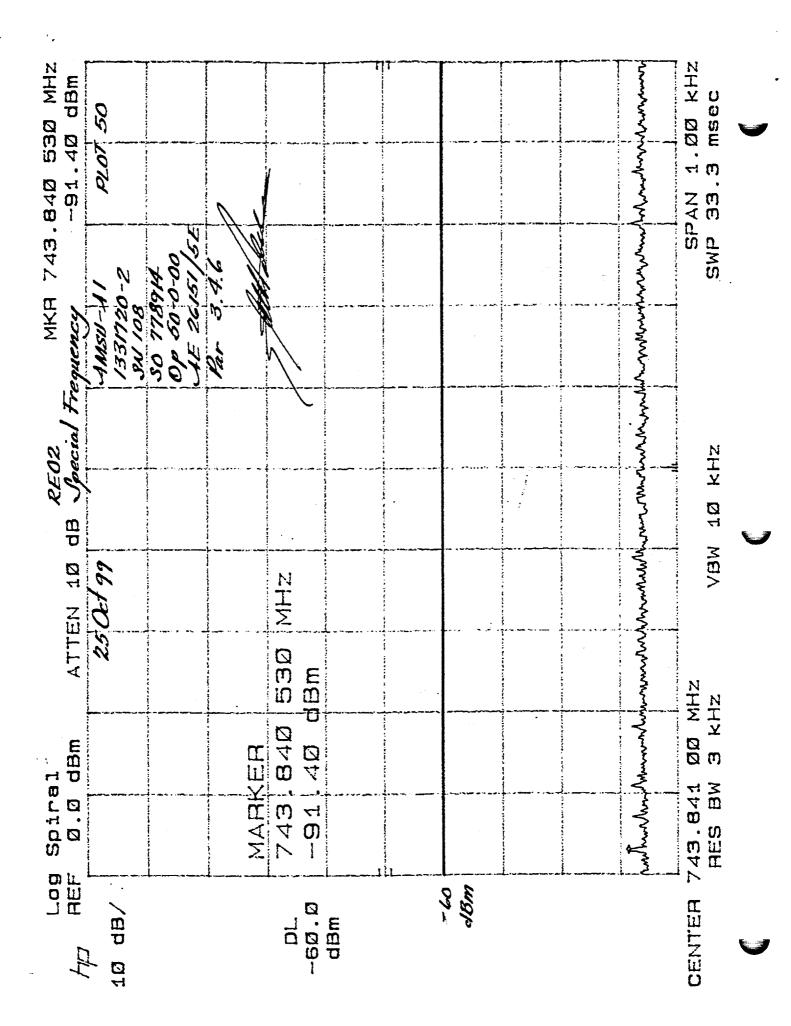


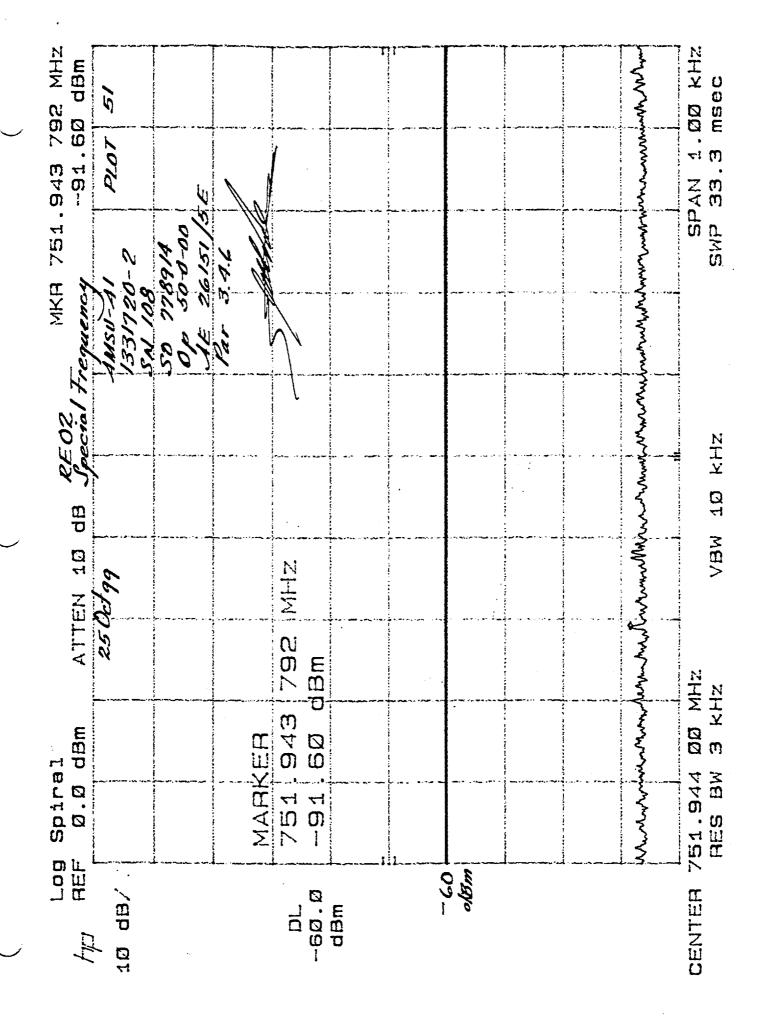


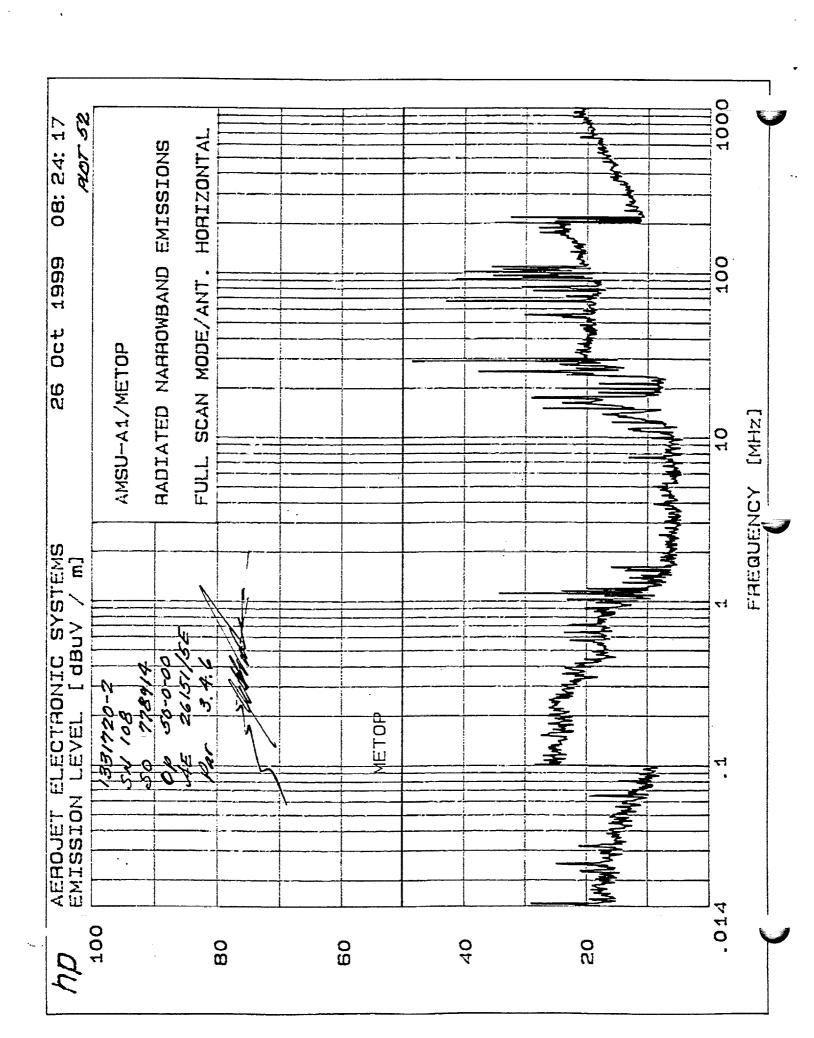
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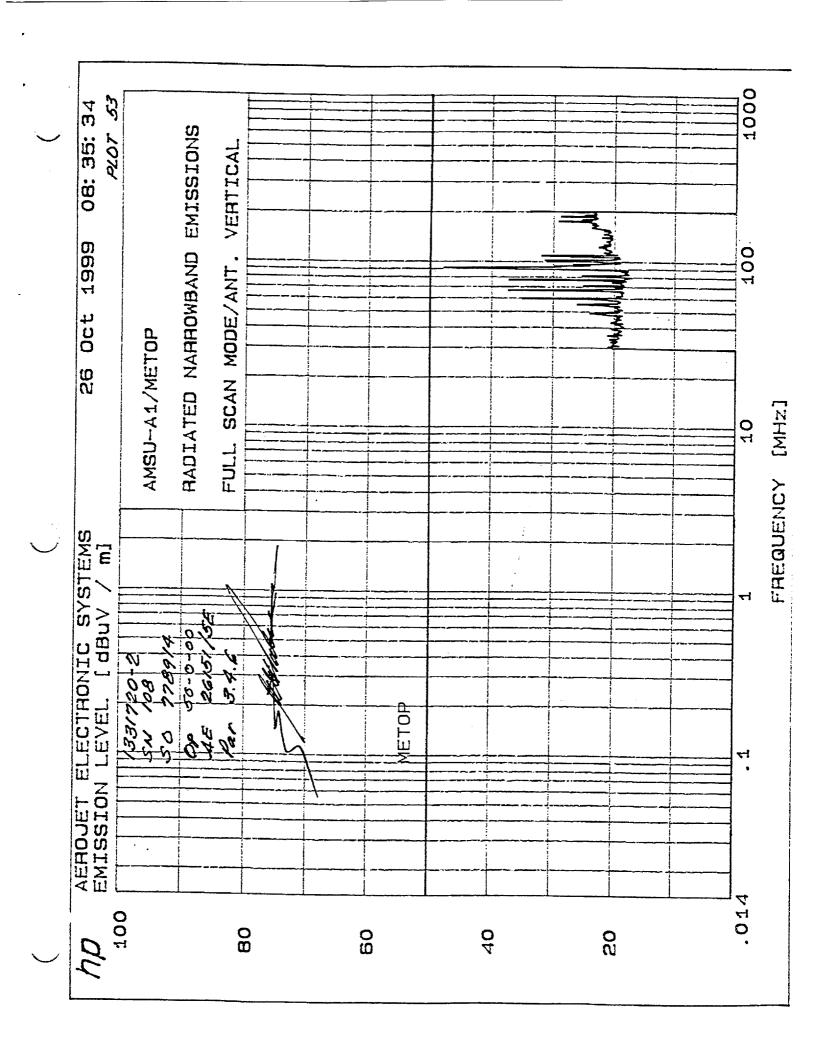
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25 Oct 1999 14: 37: 54	AMSU-A1/METOP	RADIATED NAHROWBAND EMISSIONS FULL SCAN MODE/ANT. VERTICAL			HALVARAMINA PLANTA SANTANA			18000	[MHz]
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-107.1 dBm/m (20dBuV/m)

EOZ Special Freguency ROT 59 MKR #1 FRQ 1.225 75 GHz	YSTEMS -119.58 dBm	1331720-2 SAMPLE	50 178914 00 58-0-00 45 26151/55	luc 34.6				and anomed the terrest of the second supering in the second secon	STOP 1.257 00 GHz
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11-18m) (19 dBµV)

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	AEROJET ELECTRONIC SYSTEMS	4MSU-72SAMPLE 1331720-2 5X1 108	50 7787/4 00 505-00	Man. 39.6			per allegen and the second of	8 GHz ST0P 1.614 88 GHz
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d8m/m (21d8µx/m)

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(4) 07:54:46 OCT 28, 1999 REOZ Sparial Frequency Del. Bl. -80.00 dBm Ant: Khrizontal MKR #1 FRQ 2.052 865 GHz

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-126.7 48m/m (848µr/m)

7z 7z	dBm			,		*		T	T		2
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-124.7 dBm/m (8dBµV/m)

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